

ART. VI.—*Notes on Didymograptus caduceus, Salter, with  
Remarks on its Synonymy.*

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This species is very well known to Australian geologists, its occurrence in Victoria having been announced by Professor Sir Frederick McCoy in 1861,\* and in 1875 he figured it in his *Prodromus of the Palæontology of Victoria*,† giving at the same time a very full and careful description, and enumerating several of the variations under which it presents itself.

While it is fairly constant in form, it shows a great range of variability in several points, such as the width of the stipe, the number of hydrothecæ in a given length, and the size of the sicula. In one point I have, however, not been able to confirm the exactness of the figures in the *Prodromus*, though, as will be presently seen, I do not deny the possibility of the occurrence of specimens exhibiting this feature.

The examination of a large series has shown that the first two hydrothecæ formed are in contact by their inferior margins for from about a quarter to three-quarters of their length, leaving between the outer extremities of these margins a more or less deep, acute, V-shaped space, the apex of which is rounded, probably by an extension of the periderm between the two hydrothecæ. In one example from Castlemaine the margins only of the hydrothecæ are preserved in this region, being shown as a fine black line. In this specimen the concrescence of the margins of the first two hydrothecæ is clearly seen for a portion of their length; they then diverge, leaving between them a space which is acutely pointed below, no extension of the periderm being seen. From its position, immediately over the broad extremity

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\* Exhibition Essays, 1861, p. 161, reprinted in A.M.N.H., vol. ix., 1862.

† Decade II., plate xx., figs. 3, 4, 5.

of the sicula, it is improbable that the slight extension of the periderm represents a median azygos hydrotheca, and from the fact that it is clearly seen to be closed below in some specimens it cannot represent the upper open end of the sicula. The figures in the Prodrömus, above alluded to, apparently show the first two hydrothecæ in contact by their inferior margins throughout their whole length, and since they are certainly in contact in most specimens for a part of their length, there is nothing inherently improbable in this occurrence: still, I have not seen an instance of it. Sir Frederick McCoy has kindly allowed me to examine closely the examples of this species in the National Museum, including the two larger specimens figured in the Prodrömus. The specimen from which figures 5 and 5a were taken could not, however, be identified. The two larger specimens figured are not sufficiently well preserved to allow of an expression of opinion one way or the other. All the well-preserved specimens in the Museum showed the character I have drawn attention to. Nearly 150 specimens in my own collection and ninety-six in the collection of Mr. G. B. Pritchard (which were kindly placed at my disposal by him) showed the same structure. Mr. J. A. Atkinson has obligingly examined about fifty examples which he has from Castlemaine, and has shown me four in which the separation of the distal ends of the margins is not clear; but as the examples are not very well preserved, and are, I think, slightly distorted, they cannot be taken into account. Thus in fully 300 examples which were in a fairly good state of preservation the character is constant, and the only specimens in which it was not clearly shown were either damaged, weathered, or distorted by cleavage.

Dr. Perner has recently figured two examples from Bohemia,\* which are, however, so imperfectly preserved and distorted in the sicular region that the original form of this portion is quite indecipherable.

#### SYNONYMY.

Considerable confusion exists as to the generic position and correct name of this species. *Didymograptus caduceus* was

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\* Etudes sur les Graptolites de Bohême, 2ième partie, pl. vi., figs. 9, 10, 11.

originally founded by Salter on some specimens from Canada submitted to him by Dr. Bigsby,\* and was subsequently recognised by its describer in the Skiddaw slates of England.† James Hall‡ referred Salter's species to a form which he named *Graptolithus bigsbyi* (a *Tetragraptus*), and which appears to be regarded by some authors as a synonym of *T. bryonoides* (*T. serra*).

If the reference were correct, then Salter's name should stand and not Hall's, a fact already pointed out by Herrmann.§ However, the identity is by no means clear. Salter's figures plainly show a form in which the width of the stipe immediately over the sicula is as great as that of its more distal portion; while from the minor end of the sicula the prolongation of the virgula, so characteristic of the species, is represented as a fine, hair-like line; moreover, he begins his description with the words "*D. stipite filiformi longo.*" In Hall's figures, on the other hand, the median process is clearly a third branch, and in no way resembles the delicate thread shown by Salter, and which in our specimens is certainly not a branch.

Professor H. A. Nicholson, in his paper on the Skiddaw graptolites,|| states that from an examination of *Tetragraptus bryonoides* he is inclined to agree with James Hall, and refer all the specimens in the *caduceus* form which he has seen to that species. At the same time he says that "whilst it is possible that there may really exist a distinct species with the characters of *D. caduceus*, Salter, it certainly appears not to occur in the Skiddaw slates, since all the specimens which could be referred to this species, when well preserved, show traces of a third and even sometimes of a fourth stipe." At a subsequent date¶ he found a species in the Skiddaw slates which seems to agree perfectly with Salter's Canadian species. This species he named *D. gibberulus*. As a justification of his position he says that

\* Quart. Journal Geol. Society, ix., p. 87.

† *id.*, xix., p. 136.

‡ Graptolites of the Quebec group, pp. 42, 87.

§ See Geological Magazine for 1886.

According to Perner (*Etudes sur les Grap. de Bohême*, pt. ii., p. 20) the reference to the species as *Tetragraptus caduceus* is due to Brögger, but the paper by the latter author is inaccessible to me, and as Perner's paper only arrived in Melbourne the day before this article was appointed to be read, I have left the reference as it stands.

|| Quart. Jour. Geol. Soc., vol. xxiv., pp. 131-133.

¶ Annals and Mag. Nat. Hist. 4, xvi., 271.



Salter's *original* specimen was beyond doubt an example of *Tetragraptus bryonoides* or *T. bigsbyi*, and that Salter then confused an English species with it. It seems to me, however, that Professor Hall has by no means proved that Salter made a mistake, for he apparently did not see Salter's species—at any rate, he does not figure it. The Skiddaw slates and the Quebec group are on the same horizon, so there is nothing improbable in Salter's species being found in England. From this it would appear that *D. gibberulus* must be relegated to synonymy, for it does not seem separable from *D. caduceus*.

Mr. R. Etheridge, jun., in his paper on the Victorian graptolites,\* when dealing with *T. bryonoides*, accepts the decision that *D. caduceus* is referable to that species. At the same time he suggests the advisability of keeping Salter's name for a variety which he recognises as constant in its characters, and as agreeing with Salter's figures and descriptions.

In a previous paper† I tacitly accepted the identity of *Tetragraptus bigsbyi* and *Didymograptus caduceus*, and, as Salter had clear priority, called the species *T. caduceus*, in this following Herrmann's lead. At the same time I kept *T. bryonoides*, Hall, (= *T. serra*, Brong.) distinct. I now regard Salter's species as a clear *Didymograptus*. I examined a very large number, probably some thousands, in the field during my residence in Castlemaine, where it occurs in profusion, and gathered every specimen that appeared to point to its being a *Tetragraptus*. These I have repeatedly examined carefully and without any hesitation refer all the forms with more than two arms to *T. serra*, Brong. The distinguishing points are just those that Professor Nicholson drew attention to when describing *D. gibberulus*. The distinction is that the first developed hydrothecae of *D. caduceus* are as large as any subsequently formed, and that their long axis agrees with that of the sicula; whereas in *T. serra* (= *T. bryonoides*) they are invariably much smaller and diverge greatly from the sicular axis usual in *Didymograpti*. The result of this is that the stipe of the latter species is much contracted or narrowed in the sicular region, while in the former species it practically reaches its full width at once.

\* Annals and Mag. Nat. Hist., 4, iv.

† Proceedings Royal Soc. Victoria, 1894.

The Synonymy may then be expressed as follows:—

*Didymograptus caduceus*, Salter.

*Didymograptus caduceus*, Salter, Q.J.G.S., ix., 87, fig. 1, *id.* xix., p. 136, figs. 13*a*, *b*; McCoy, Prodrömus of the Palæontology of Victoria, Decade ii., pl. 20.

*Graptomolithus bigsbyi*, pars. J. Hall, Grap. Quebec Group, pp. 42, 87.

*Tetragraptus bryonoides*, pars. Nicholson, Q.J.G.S., xxiv., pp. 131, 133; R. Etheridge, junior, Ann. and Mag. Nat. Hist., 4, iv., pl. iii., figs. 3, 4.

*Didymograptus gibberulus*, Nicholson, A.M.N.H., 4, xvi., p. 257.

*Tetragraptus caduceus*, Herrmann, Nyt. Mag. for Naturvid, xxix., translated in Geol. Mag., 1886; ? Brögger, Die Silurischen Etagen im Christianiagebiet.

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